U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 USC 371

ATTORNEY DOCKET NO.: 211016

U.S. APPLICATION NO.: 09/830727

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/AU99/00946	01 November 1999	30 October 1998

TITLE OF INVENTION
A METHOD OF RECORDING THE TEMPERATURE OF PERISHABLE PRODUCTS IN COLD CHAIN DISTRIBUTION

APPLICANT(S) FOR DO/EO/US
Richardson Donald George

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 USC 371.

2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 USC 371.

3. ☒ This is an express request to begin national examination procedures (35 USC 371(f)).

4. ☒ The US has been elected by the expiration of 19 months from the priority date (PCT Article 31).

5. ☒ A copy of the International Application as filed (35 USC 371(c)(2))
   a. ☐ is attached hereto (required only if not communicated by the International Bureau).
   b. ☒ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).

6. ☐ An English language translation of the International Application as filed (35 USC 371(c)(2)).

7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 USC 371(c)(3))
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.

8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 USC 371(c)(3)).

9. ☒ An oath or declaration of the inventor(s) (35 USC 371(c)(4)).

10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 USC 371(c)(5)).

11. Nucleotide and/or Amino Acid Sequence Submission
   a. ☐ Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. ☐ CD-ROM or CD-R (2 copies); or
      ii. ☐ Paper Copy
   c. ☐ Statement verifying identity of above copies

Items 12 to 19 below concern other document(s) or information included:

12. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
   ☐ Form PTO-1449
   ☐ Copies of Listed Documents

13. ☐ An assignment for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.

14. ☒ A FIRST preliminary amendment.
   ☐ A SECOND or SUBSEQUENT preliminary amendment.

15. ☐ A substitute specification.

16. ☐ A change of power of attorney and/or address letter.

17. ☒ Application Data Sheet Under 37 CFR 1.76

18. ☒ Return Receipt Postcard

19. ☒ Other items or information:
   Claims as Amended on April 30, 2001
   Claims Pending as of April 30, 2001

U.S. APPLICATION NO. 09/830727	INTERNATIONAL APPLICATION NO. PCT/AU99/00946	ATTORNEY DOCKET NO. 211016

20. ☒ The following fees are submitted:	CALCULATIONS	PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5)):		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO $1,000.00		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO ..... $ 860.00		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO, but international search fee (37 CFR 1.445(a)(2))paid to USPTO ..... $ 710.00		
International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4)..... $ 690.00		
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1) to (4) ..... $ 100.00		
ENTER APPROPRIATE BASIC FEE AMOUNT=	$1000.00	
Surcharge of $130.00 for furnishing the National fee or oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date	$	

CLAIMS	NUMBER FILED		NUMBER EXTRA	RATE		
Total Claims	26	-20=	6	x $ 18.00	$108.00	
Independent Claims	2	- 3 =	0	x $ 80.00	$0.00	
☐ Multiple Dependent Claim(s) (if applicable)				+$270.00	$0.00	
				TOTAL OF ABOVE CALCULATIONS=	$1108.00	
☒ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.					$554.00	
				SUBTOTAL=	$554.00	
Processing fee of **$130.00** for furnishing English Translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date.					$	
				TOTAL NATIONAL FEE=	$554.00	
Fee for recording the enclosed assignment. The assignment must be accompanied by an appropriate cover sheet. $40.00 per property +					$	
				TOTAL FEE ENCLOSED=	$554.00	
				Amount to be: refunded	$	
				charged:	$	

a. ☒ A check in the amount of $554.00 to cover the above fee is enclosed.

b. ☐ Please charge Deposit Account No. 12-1216 in the amount of $ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 12-1216. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Customer Number: 23460

23460

PATENT TRADEMARK OFFICE

Kenneth P. Spina, Registration No. 43,927
One of the Attorneys for Applicant

Date: April 30, 2001

PATENT
Attorney Docket No. 211016

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Richardson

Application No. Unassigned

Filed: Herewith

Art Unit: Unassigned

Examiner: Unassigned

For: A METHOD OF RECORDING THE TEMPERATURE OF PERISHABLE PRODUCTS IN COLD CHAIN DISTRIBUTION

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Prior to the examination of the above-identified patent application, please enter the following amendments and consider the following remarks.

AMENDMENTS

IN THE CLAIMS:

Replace all previous versions of the pending claims with:

1. (Amended) A method of monitoring a consignment of goods including the following steps:

measuring a predetermined parameter or parameters of said consignment using a disposable sender device attachable to said consignment;

transmitting a signal containing data representative of said measured parameter to a central location;

maintaining a database relating to said consignment at said central location, said database including said data representative of said measured parameters;

initializing said database to include consignment data for each consignment; and

providing secure communication access to said database to enable monitoring by enabled users of data available from said database.

2. A method of monitoring according to claim 1 wherein said parameter or parameters are measured continuously or at predetermined intervals and said data includes time indicative data associated with said measurements.

3. A method of monitoring according to claim 2 wherein the parameter is the temperature of the consignment.

4. (Amended) A method of monitoring according to claim 1 including the step of communicating the data to an intermediate sender device provided at the location of the consignment and transmitting the data from the intermediate sender device to said central location.

5. A method of monitoring according to claim 4 including the step of determining the location of the consignment and including data representative of the determined location in said data transmitted to said central location.

6. (Amended) A method of monitoring according to claim 1 including the step of storing said data in a storage means before transmission to said central location.

7. (New) A method of monitoring according to claim 4 including the step of storing said data in a storage means before transmission to said central location.

8. (Amended) A method of monitoring according to claim 7 wherein said storage means is provided in said intermediate sender device.

9. (Amended) A method of monitoring according to claim 1 wherein said database includes set point values associated with said consignment for one or more of said measured parameters and the method includes comparing measured values with corresponding set point values to determine whether the consignment is meeting predetermined conditions.

10. (Amended) A method of monitoring according to claim 1 wherein said consignment data for each consignment includes dispatch and product data.

11. (Amended) A method of monitoring according to claim 1 wherein said secure communication access is provided via the Internet.

12. (Amended) A system for monitoring a consignment of goods including:

a sender device attachable to send consignment including a measurement means for measuring a predetermined parameter or parameters of said consignment;

first communication means for transmitting a signal containing data representative of said measured parameter to a central location;

computer system means for maintaining a database relating to said consignment at said central location said database including said data representative of said measured parameters and wherein said database is initialized to include consignment data for each consignment, and

a secure communication access means for providing access to said database to enable monitoring by enabled users of data available from said database.

13. A system for monitoring according to claim 12 wherein said parameter or parameters are measured continuously or at predetermined intervals and said data includes time indicative data associated with said measurements.

14. A system for monitoring according to claim 13 wherein the parameter is the temperature of the consignment.

15. (Amended) A system for monitoring according to claim 12 wherein said first communication means is included in said sender device for communicating the data to an intermediate sender device provided at the location of the consignment and a second communication means being included in said intermediate sender device for transmitting the data form the intermediate sender device to said central location.

16. A system for monitoring according to claim 15 including location determining means for determining the location of the consignment and means for including data representative of the determined location in said data transmitted to said central location.

17. A system for monitoring according to claim 16 wherein said location determining means includes a global positioning system.

18. (Amended) A system for monitoring according to claim 16 wherein said location determining means is included in said intermediate sender device.

19. (Amended) A system for monitoring according to claim 15 including a storage means for storing said data before transmission to said central location.

20. (Ncw) A system for monitoring according to claim 12 including a storage means for storing said data before transmission to said central location.

21. (Amended) A system for monitoring according to claim 19 wherein said storage means is provided in said intermediate sender device.

22. (Amended) A system for monitoring according to claim 12 wherein the sender device is disposable and battery powered.

23. (Amended) A system for monitoring according to claim 12 wherein the sender device is disposable and inductively powered from said intermediate sender device.

24. (Amended) A system for monitoring according to claim 12 wherein said database includes set point values associated with said consignment for one or more of said measured parameters and said computer system means includes comparison means for comparing measured values with corresponding set point values to determine whether the consignment is meeting predetermined conditions.

25. (Amended) A system for monitoring according to claim 12 wherein said consignment data for cach consignment includes dispatch and product data.

26. (Amended) A system for monitoring according to claim 12 wherein said secure communication access means provides said access via the Internet.

REMARKS

This amendment serves to present a clean version of the entire set of pending claims in the above-captioned patent application. The pending claims presented herein replace all previous versions of any pending claims. Separate documents setting forth the precise changes to the claims, as well as all the pending claims, are enclosed herewith. The amendments to the claims and new claims are fully supported by the specification. No new matter has been added.

Conclusion

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,

Kenneth P. Spina, Reg. No. 43,927
One of the Attorneys for Applicant(s)
LEYDIG, VOIT & MAYER, LTD.
Two Prudential Plaza, Suite 4900
180 North Stetson
Chicago, Illinois 60601-6780
(312) 616-5600 (telephone)
(312) 616-5700 (facsimile)

Date: April 30, 2001

PATENT
Attorney Docket No. 211016

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Richardson

Application No. Unassigned

Filed: Herewith

Art Unit: Unassigned

Examiner: Unassigned

For: A METHOD OF RECORDING THE TEMPERATURE OF PERISHABLE PRODUCTS IN COLD CHAIN DISTRIBUTION

CLAIMS AS AMENDED ON APRIL 30, 2001

Amendments to existing claims:

1. (Amended) A method of monitoring a consignment of goods including the following steps:

measuring a predetermined parameter or parameters of said consignment using a disposable sender device attachable to said consignment;

transmitting a signal containing data representative of said measured parameter to a central location;

maintaining a database relating to said consignment at said central location, said database including said data representative of said measured parameters;

[initiating] <u>initializing</u> said database to include consignment data for each consignment; and

providing secure communication access to said database to enable monitoring by enabled users of data available from said database.

4. (Amended) A method of monitoring according to claim 1 [or claim 2] including the step of communicating the data to an intermediate sender device provided at the location of the consignment and transmitting the data from the intermediate sender device to said central location.

6. (Amended) A method of monitoring according to [any one of the prceeding claims] claim 1 including the step of storing said data in a storage means before transmission to said central location.

8 [7]. (Amended) A method of monitoring according to claim 7 [6 when appended to claims 4 or 5] wherein said storage means is provided in said intermediate sender device.

9 [8]. (Amended) A method of monitoring according to [anyone of the preceding claims] claim 1 wherein said database includes set point values associated with said consignment for one or more of said measured parameters and the method includes comparing measured values with corresponding set point values to determine whether the consignment is meeting predetermined conditions.

10 [9]. (Amended) A method of monitoring according to [any one of the preceding claims] claim 1 wherein said consignment data for each consignment includes dispatch and product data.

11. (Amended) A method of monitoring according to [any one of the preceding claims] claim 1 wherein said secure communication access is provided via the Internet.

12. (Amended) A system for monitoring a consignment of goods including:

a sender device attachable to send consignment including a measurement means for measuring a predetermined parameter or parameters of said consignment;

first communication means for transmitting a signal containing data representative of said measured parameter to a central location;

computer system means for maintaining a database relating to said consignment at said central location said database including said data representative of said measured parameters and wherein said database is [initiated] initialized to include consignment data for each consignment, and

a secure communication access means for providing access to said database to enable monitoring by enabled users of data available from said database.

15. (Amended) A system for monitoring according to claim 12[, claim 13 or claim 14] wherein said first communication means is included in said sender device for communicating the data to an intermediate sender device provided at the location of the

consignment and a second communication means being included in said intermediate sender device for transmitting the data form the intermediate sender device to said central location.

18. (Amended) A system for monitoring according to claim 16 [or 17] wherein said location determining means is included in said intermediate sender device.

19. (Amended) A system for monitoring according to [any one of claims 12 to 18] claim 15 including a storage means for storing said data before transmission to said central location.

21 [20]. (Amended) A system for monitoring according to claim 19 [when appended to any one of claims 15 to 18] wherein said storage means is provided in said intermediate sender device.

22 [21]. (Amended) A system for monitoring according to [any one of claims 12 to 20] claim 12 wherein the sender device is disposable and battery powered.

23 [22]. (Amended) A system for monitoring according to [any one of claims 12 to 20] claim 12 wherein the sender device is disposable and inductively powered from the said intermediate sender device.

24 [23]. (Amended) A system for monitoring according to [anyone of claims 12 to 22] claim 12 wherein said database includes set point values associated with said consignment for one or more of said measured parameters and said computer system means includes comparison means for comparing measured values with corresponding set point values to determine whether the consignment is meeting predetermined conditions.

25 [24]. (Amended) A system for monitoring according to [any one of claims 12 to 23] claim 12 wherein said consignment data for each consignment includes dispatch and product data.

26. (Amended) A system for monitoring according to [any one of claims 12 to 24] claim 12 wherein said secure communication acccss means provides said access via the Internet.

PATENT
Attorney Docket No. 211016

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Richardson

Application No. Unassigned

Filed: Herewith

Art Unit: Unassigned

Examiner: Unassigned

For: A METHOD OF RECORDING THE TEMPERATURE OF PERISHABLE PRODUCTS IN COLD CHAIN DISTRIBUTION

CLAIMS PENDING AS OF APRIL 30, 2001

1. A method of monitoring a consignment of goods including the following steps:

measuring a predetermined parameter or parameters of said consignment using a disposable sender device attachable to said consignment;

transmitting a signal containing data representative of said measured parameter to a central location;

maintaining a database relating to said consignment at said central location, said database including said data representative of said measured parameters;

initializing said database to include consignment data for each consignment; and

providing secure communication access to said database to enable monitoring by enabled users of data available from said database.

2. A method of monitoring according to claim 1 wherein said parameter or parameters are measured continuously or at predetermined intervals and said data includes time indicative data associated with said measurements.

3. A method of monitoring according to claim 2 wherein the parameter is the temperature of the consignment.

4. A method of monitoring according to claim 1 including the step of communicating the data to an intermediate sender device provided at the location of the

consignment and transmitting the data from the intermediate sender device to said central location.

5. A method of monitoring according to claim 4 including the step of determining the location of the consignment and including data representative of the determined location in said data transmitted to said central location.

6. A method of monitoring according to claim 1 including the step of storing said data in a storage means before transmission to said central location.

7. A method of monitoring according to claim 4 including the step of storing said data in a storage means before transmission to said central location.

8. A method of monitoring according to claim 7 wherein said storage means is provided in said intermediate sender device.

9. A method of monitoring according to claim 1 wherein said database includes set point values associated with said consignment for one or more of said measured parameters and the method includes comparing measured values with corresponding set point values to determine whether the consignment is meeting predetermined conditions.

10. A method of monitoring according to claim 1 wherein said consignment data for each consignment includes dispatch and product data.

11. A method of monitoring according to claim 1 wherein said secure communication access is provided via the Internet.

12. A system for monitoring a consignment of goods including:

a sender device attachable to send consignment including a measurement means for measuring a predetermined parameter or parameters of said consignment;

first communication means for transmitting a signal containing data representative of said measured parameter to a central location;

computer system means for maintaining a database relating to said consignment at said central location said database including said data representative of said measured parameters and wherein said database is initialized to include consignment data for each consignment, and

a secure communication access means for providing access to said database to enable monitoring by enabled users of data available from said database.

13. A system for monitoring according to claim 12 wherein said parameter or parameters are measured continuously or at predetermined intervals and said data includes time indicative data associated with said measurements.

14. A system for monitoring according to claim 13 wherein the parameter is the temperature of the consignment.

15. A system for monitoring according to claim 12 wherein said first communication means is included in said sender device for communicating the data to an intermediate sender device provided at the location of the consignment and a second communication means being included in said intermediate sender device for transmitting the data form the intermediate sender device to said central location.

16. A system for monitoring according to claim 15 including location determining means for determining the location of the consignment and means for including data representative of the determined location in said data transmitted to said central location.

17. A system for monitoring according to claim 16 wherein said location determining means includes a global positioning system.

18. A system for monitoring according to claim 16 wherein said location determining means is included in said intermediate sender device.

19. A system for monitoring according to claim 15 including a storage means for storing said data before transmission to said central location.

20. A system for monitoring according to claim 12 including a storage means for storing said data before transmission to said central location.

21. A system for monitoring according to claim 19 wherein said storage means is provided in said intermediate sender device.

22. A system for monitoring according to claim 12 wherein the sender device is disposable and battery powered.

23. A system for monitoring according to claim 12 wherein the sender device is disposable and inductively powered from the said intermediate sender device.

24. A system for monitoring according to claim 12 wherein said database includes set point values associated with said consignment for one or more of said measured parameters and said computer system means includes comparison means for comparing measured values with corresponding set point values to determine whether the consignment is meeting predetermined conditions.

25. A system for monitoring according to claim 12 wherein said consignment data for each consignment includes dispatch and product data.

26. A system for monitoring according to claim 12 wherein said secure communication access means provides said access via the Internet.

TITLE: A METHOD OF RECORDING THE TEMPERATURE OF PERISHABLE PRODUCTS IN COLD CHAIN DISTRIBUTION

TECHNICAL FIELD

The present invention relates to the continuous monitoring and ready retrieval of time, temperature and other consignment data of perishables products, as they are transported between processor (consignor) and ultimate retailer sites (consignee), along what is referred to as the cold chain, and, more particularly to a method and apparatus for enabling such monitoring in an efficient and low cost manner. Although the invention will be described in terms of its application to a cold chain, it will be appreciated that the invention is equally applicable to other forms of consignment system.

BACKGROUND ART

There has been a significant trend to the use of more perishable, fresh, chilled (and frozen) foods, beverages and temperature sensitive biomedical and pharmaceutical products, compared with the temperature stable, processed or preserved substitute products. At the same time there is an increasing concern by consumers and governments to ensure the quality and safety of these temperature sensitive perishable products, is not jeopardised by hazardous handling prior to consumption. New temperature management tools are useful to minimise these handling hazards in domestic and international trade.

Various types of temperature measurement and recording equipment have been used in the past for this task and record of these are discussed below.

The family of portable reusable data loggers that are placed in perishable product consignments by the shipper to be retrieved and the stored temperature and time data downloaded by either linking to a programmed personal computer, or by removing a printed chart, have been in use by the food and pharmaceutical industries for many years. These robust, portable recorders are expensive and need to be returned to the shipper on consignment completion. Additionally the data is not accessible until the logger is ultimately read and this maybe after a product recall or hold, should have been triggered. This means that the monitoring devise cannot be as widely used as safe product temperature management directs.

Refrigerated transportation vehicles and shipping containers used for perishable goods transfer have recording chart thermometers for recording the temperature of the interior space. These charts are specific for each vehicle in the cold chain and do not capture the product consignment temperature and time as the product moves between vehicles in the supply chain. It is therefore difficult to marry the charts with specific consignments on other than a post-mortem basis which is not as responsive as industry shippers would like, in terms of being able to anticipate and respond to potential temperature abuse hazards during distribution. As such they do not provide a seamless data stream throughout cold chain distribution.

The cumulative time and temperature effect is also indicated by a chemically based product, Monitor Mark™. These time/temperature integrators are monitoring tools that provide a visual , non reversible, indication of time and temperature exposure above a pre-set threshold temperature. This is accompanied by the appearance and migration of a blue colour, left to right through a series of viewing windows on a

rectangular flat laminate containing layers of paper film, adhesive and other active chemical components. These strips are typically 96mm by 20mm and while relatively inexpensive, only indicate, as distinct from measure, product exhibiting time temperature abuse sensitivity and represent a signal as to when product quality should be checked prior to use.

The temperature, time and location state of air-freight consignments of perishable products are also recorded in a specially designed aluminium 'Envirotainer'. This is a returnable unit, typically owned by the airline, and is a capital expensive solution to the problem of temperature management for just a part of the cold chain.

DISCLOSURE OF THE INVENTION

The present invention seeks to provide all the advantages of the above systems together while overcoming or at least ameliorating one or more of the disadvantages of the prior art. Desirably, at least in its embodiments, the invention will provide the advantages of being able to economically continuously monitor and record desired parameters (for example, temperature, time and location) of a consignment from the production point to the retailer warehouse or outlet. Preferably, where perishable goods are being consigned, the invention may provide in-built alerts to signal consignment temperature (or location) abuse from a specified condition and a potential spoilage predictor, consistent with the reduction of distribution related, food safety and food quality risks.

The present invention provides in one aspect, a method of monitoring a consignment of goods comprising the following steps:

measuring a predetermined parameter or parameters of said consignment using a disposable sender device attachable to said consignment;

transmitting a signal containing data representative of said measured parameter to a central location; and

maintaining a database relating to said consignment at said central location, said database including said data representative of said measured parameters;

initiating said database to include consignment data for each consignment; and

providing secure communication access to said database to enable monitoring by enabled users of data available from said database.

Preferably. the parameter or parameters are measured continuously or at predetermined intervals and said data includes time indicative data associated with said measurements. For preference, the method includes the step of communicating the data to an intermediate sender device provided at the location of the consignment and transmitting the collected data from the intermediate sender device to the central location.

Preferably the method further includes the step of determining the location of the consignment and including data representative of the determined location in the data transmitted to the central location.

For preference, the database includes set point values associated with the consignment for one or more of the measured parameters and the method includes comparing measured values with corresponding set point values to determine whether the consignment is meeting predetermined conditions.

According to a second aspect the present invention provides a system for monitoring a consignment of goods including:

a sender device attachable to said consignment including a measurement means for measuring a predetermined parameter or parameters of said consignment;

first communication means for transmitting a signal containing data representative of said measured parameter to a central location; and

computer system means for maintaining a database relating to said consignment at said central location, said database including said data representative of said measured parameters and wherein said database is initiated to include consignment data for each consignment, and

a secure communication access means for providing access to said database to enable monitoring by enabled users of data available from said database.

Preferably, the system includes the first communication means in said sender device for communicating the data to an intermediate sender device provided at the location of the consignment and a second communication means being included in the intermediate sender device for transmitting the data from the intermediate sender device to the central location.

For preference, the system includes a location determining means for determining the location of the consignment and means for including data representative of the determined location in the data transmitted to the central location.

In one embodiment the attachable sender device is a small adhesively backed, robustly designed, inexpensive and non-returnable, battery powered, temperature monitor and sender. This sender device is fastened to pallet loads of perishable products

that may require shipment between specified temperature ranges to ensure food safety risks are eliminated and food quality is maximised. Typically, chilled foods being kept at 4°C or below and frozen foods at -18°C or below.

Preferably, the sender/s and tracker are generating location and time data signals, together with the accurate temperature signals, and these signals are communicated to a central database operated on behalf of numerous perishables freight originators. Such mobile communication of simple data signals is via appropriate technologies depending

on specifics of location tracking discrimination, and global location, but normally would be via global systems for mobile phone (GSM) for terrestrial movements, together with triangulation for reasonable location precision and, via satellites for global positioning system (GPS), for more precise location data and certain specific country applications.

Preferably, the signals sent to the central database by the sender are integrated with other consignment data. This other data can be sent directly and electronically to the database by the consignment originator, such as dispatch date, time, product and manufacturing code, time/temperature tolerance ranges for abuse determination and recall alert, together with, preferred report page layout formats and company identification headers, for the ultimate output printing or communicating, in terms of time/temperature/location plots, including geographic charts for visual tracking purposes.

Preferably, the signals are sent by senders attached to pallet loads of perishable products being transported both domestically and internationally, with likely transit times from ovemight, to 30+days duration, in the case of refrigerated containerised shipments on international routes. Senders for different temperature and time ranges may havc differing battery lives, designed temperature ranges and associated distinguishing marks to facilitate easy sender product selection and use.

Typically, the signal functionality and pitch intervals of the sender is kept to a minimum and the database infrastructure provides as much consignment information as possible for overall data processing, to ensure that the manufactured cost and price of the disposable, mass produced senders, is low in relation to the profit potential of each pallet consigned. Low sender prices motivate high usage of the system, consistent with

enhancing the safety and quality of the cold chain in this country and its export markets. Superior supply chain performance enhances overall competitiveness in global business. The system permits transparent scrutiny of supply chain service providers delivery and ready measurement of their key performance indicators including driver stops and fatigue.

Typically, the central data-base is accessed by the consignor via Internet communication linkup, on a secure basis, by logging onto the system with a password via a desktop, or laptop or portable computer, in an office, or from the field, location and the specific details of every pallet consigned with a sensor, can then be viewed or printed out, via the consignor's home page. The regular or automatic interrogation of the system confirms safe shipment progress or shipment completion, but also additionally identifies any abused shipment and its location for earlier recall intervention, if required. Alternatively, the central data-base can be selectively and securely linked to a consignee's mainframe computer system so that information is automatically captured and exception reporting and recall alerts only require management intervention.

Preferably, the accuracy of the temperature data provided (0.5°C accuracy) in hard copy form can be so calibrated and validated as to provide a solid legal foundation for consignor dialogue with receiving party and transporting parties and so facilitate dispute resolution between such parties, minimise the effect of the human frailties inherent in the current supply cold chain, and generally provide a tool for heightening awareness of the importance of the cold chain management in providing safe, quality food and other perishables.

Typically, pallet loads of perishable products (or smaller units than a pallet, such as a single shipping carton in the case of high value products like certain live or chilled seafood or biomedicals / pharmaceuticals) are transhipped from processor or consignor by refrigerated truck, railcar, shipping container and ultimately by air-freight in certain cases, before reaching their destination. The communication of the specific sender signal has therefore some barriers to ready transmission. For this reason the sender may have a limited capacity memory, to retain the signal stream until the transmission interruption ends and once again allows signal to be sent to the central data-base.

In the preferred embodiment of the invention, the sender signal stream from a loaded truck or shipping container, may in the first instance be received by an on-board reader/tracker, tuned to the system rf signal frequency to minimise such interference, and then communicated to the central database for real-time integration of the perishable shipment's temperature and location status, with the other company specific data. The other company data may be consistent with scannable EAN128/SSCC (Serial Shipping Container Code), together with certain specific keyed in data, like sender identity.

Other embodiments of the invention can have only part of the sender system capability being used at times, for instance as an intelligent consignment tag, where location data is important but temperature ignored, as in very valuable dry goods distribution where pilfering and consignment theft are a risk - cigarettes/whisky; or, in instances where the temperature data and alert capability is important, but location data ignored, as in storage of frozen products in a coldstore, where a hotline message from the database could alert management that the coldstore had developed a fault during a period when unattended, and that stored product temperatures were rising dangerously.

BRIEF DESCRIPTION OF DRAWINGS

The invention will be more fully understood from the following description of a preferred embodiment which is illustrated, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a schematic block diagram of the information system network according to one embodiment of the invention;

Figure 2 shows a side elevation of an attachable sender device according to one embodiment of the invention;

Figure 3 is a diagram of the consignor's Input Data Report format; and

Figure 4 is a diagram of a typical output status report printed from the central data-base, via the Internet at the consignor's desktop computer, showing the temperature and travel time history to the current location, in real time.

MODES FOR CARRYING OUT THE INVENTION

Referring to the Figures, the consignor warehouseman 5 of a perishable product 6 selects the correct sender device 7 for the specific duty and attaches that sender device 7 by peel back adhesive tab 8 to the pallet consignment (not shown) at an optimum and designated position. The sender device 7 is activated at the time of dispatch by pulling tag 9 that irreversibly activates a battery, and, the sender specific data, which is normally indicated on the sender casing 10 by a label or other readable indicia (e.g. barcode), is then entered into the central database 11 by the warehouseman 5 (sender number, manufactures code for product, customer, date, time, report format, etc.) from his desk top computer, via modem linkage to the central database 11. An example of the consignment attribute data is shown in Figure 3. During a consignment's movement

along the cold chain 12 the sender device 7 transmits its data stream (via reader/tracker 13 as required) to the database 11 at a central location 14 where it is integrated with the stored data from warchouseman 5 in the database 11 for retrieval by Internet connection 15 by the consignor, at any convenient time and from any convenient location by the use of the consignor's specific password at the time of logging onto the system. An example of the type of information available is shown in Figure 4. The sender device 7 is removed from the consignment at the end of the cold chain 12 with the battery drained, and is responsibly disposed of by consignee warehouse 16 staff, on the formal receipt of the perishable product shipment.

The consignor now has an exact temperature record of the delivery of the shipment to a specific distribution warehouse, possibly on the other side of the continent, or into demanding export markets, after pallet/s has been transhipped a number of times from truck to railcar to container ship or plane to truck. The consignor knows the temperature, location, identity of the shipment, and the ultimate customer warehouse location, in real-time, right up to delivery acceptance by the customer. Additionally the consignor has an in-built integrator of time and temperature abuse, which would signal the need to recall (or hold) the particular pallet, due to some distribution failure and hence safety or quality concern.

The use of this information systems approach to consignment temperature management along the cold chain indicates the shipper's responsible attitude to the superior delivery of its products and protects and enhances the consignor's corporate identity in the market place.

In the preferred operation of the system, responsible shippers of perishable products adopting the system, would be able to negotiate more favourable insurance premiums for the in-transit protection of their product so adding to the overall cost benefit of the adopted temperature management system. Additionally the consignor can easily maintain electronic records of past shipments for ready retrieval, should later insurance or quality disputes arise. The past consignment data can be kept for as long as the consignor deems necessary.

It will be appreciated that standard componentry such as miniature transmitters, temperature monitors and other standard forms of communication equipment can be used to implement the invention, though in some cases it would be desirable to use custom designed hardware.

It will be apparent that further embodiments and exemplifications of the invention are possible without departing from the spirit or scope of the invention described.

CLAIMS:-

1. [Amended] A method of monitoring a consignment of goods including the following steps:

measuring a predetermined parameter or parameters of said consignment using a disposable sender device attachable to said consignment;

transmitting a signal containing data representative of said measured parameter to a central location;

maintaining a database relating to said consignment at said central location, said database including said data representative of said measured parameters;

initiating said database to include consignment data for each consignment; and

providing secure communication access to said database to enable monitoring by enabled users of data available from said database.

2. A method of monitoring according to claim 1 wherein said parameter or parameters are measured continuously or at predetermined intervals and said data includes time indicative data associated with said measurements.

3. A method of monitoring according to claim 2 wherein the parameter is the temperature of the consignment.

4. A method of monitoring according to claim 1 or claim 2 including the step of communicating the data to an intermediate sender device provided at the location of the

consignment and transmitting the data from the intermediate sender device to said central location.

5. A method of monitoring according to claim 4 including the step of determining the location of the consignment and including data representative of the determined location in said data transmitted to said central location.

6. A method of monitoring according to any one of the preceding claims including the step of storing said data in a storage means before transmission to said central location.

7. A method of monitoring according to claim 6 when appended to claims 4 or 5 wherein said storage means is provided in said intermediate sender device.

8. A method of monitoring according to anyone of the preceding claims wherein said database includes set point values associated with said consignment for one or more of said measured parameters and the method includes comparing measured values with corresponding set point values to determine whether the consignment is meeting predetermined conditions.

9. [amended] A method of monitoring according to any one of the preceding claims wherein said consignment data for each consignment includes dispatch and product data.

10. cancelled

11. [amended] A method of monitoring according to any one of the preceding claims wherein said secure communication access is provided via the Internet.

12. [amended] A system for monitoring a consignment of goods including:

a sender device attachable to said consignment including a measurement means for measuring a predetermined parameter or parameters of said consignment;

first communication means for transmitting a signal containing data representative of said measured parameter to a central location;

computer system means for maintaining a database relating to said consignment at said central location, said database including said data representative of said measured parameters and wherein said database is initiated to include consignment data for each consignment, and

a secure communication access means for providing access to said database to enable monitoring by enabled users of data available from said database.

13. A system for monitoring according to claim 12 wherein said parameter or parameters are measured continuously or at predetermined intervals and said data includes time indicative data associated with said measurements.

14. A system for monitoring according to claim 13 wherein the parameter is the temperature of the consignment.

15. A system for monitoring according to claim 12, claim 13 or claim 14 wherein said first communication means is included in said sender device for communicating the data to an intermediate sender device provided at the location of the consignment and a second communication means being included in said intermediate sender device for transmitting the data from the intermediate sender device to said central location.

16. A system for monitoring according to claim 15 including location determining means for determining the location of the consignment and means for including data representative of the determined location in said data transmitted to said central location.

17. A system for monitoring according to claim 16 wherein said location determining means includes a global positioning system.

18. A system for monitoring according to claim 16 or 17 wherein said location determining means is included in said intermediate sender device.

19. A system for monitoring according to any one of claims 12 to 18 including a storage means for storing said data before transmission to said central location.

20. A system for monitoring according to claim 19 when appended to any one of claims 15 to 18 wherein said storage means is provided in said intermediate sender device.

21. A system for monitoring according to any one of claims 12 to 20 wherein the sender device is disposable and battery powered.

22. A system for monitoring according to any one of claims 12 to 20 wherein the sender device is disposable and inductively powered from said intermediate sender device.

23. A system for monitoring according to anyone of claims 12 to 22 wherein said database includes set point values associated with said consignment for one or more of said measured parameters and said computer system means includes comparison means for comparing measured values with corresponding set point values to determine whether the consignment is meeting predetermined conditions.

24. [amended] A system for monitoring according to any one of claims 12 to 23 wherein said consignment data for each consignment includes dispatch and product data.

25. cancelled.

ART 34 AMDT

26. [amended] A system for monitoring according to any one of claims 12 to 24 wherein said secure communication access means provides said access via the Internet.

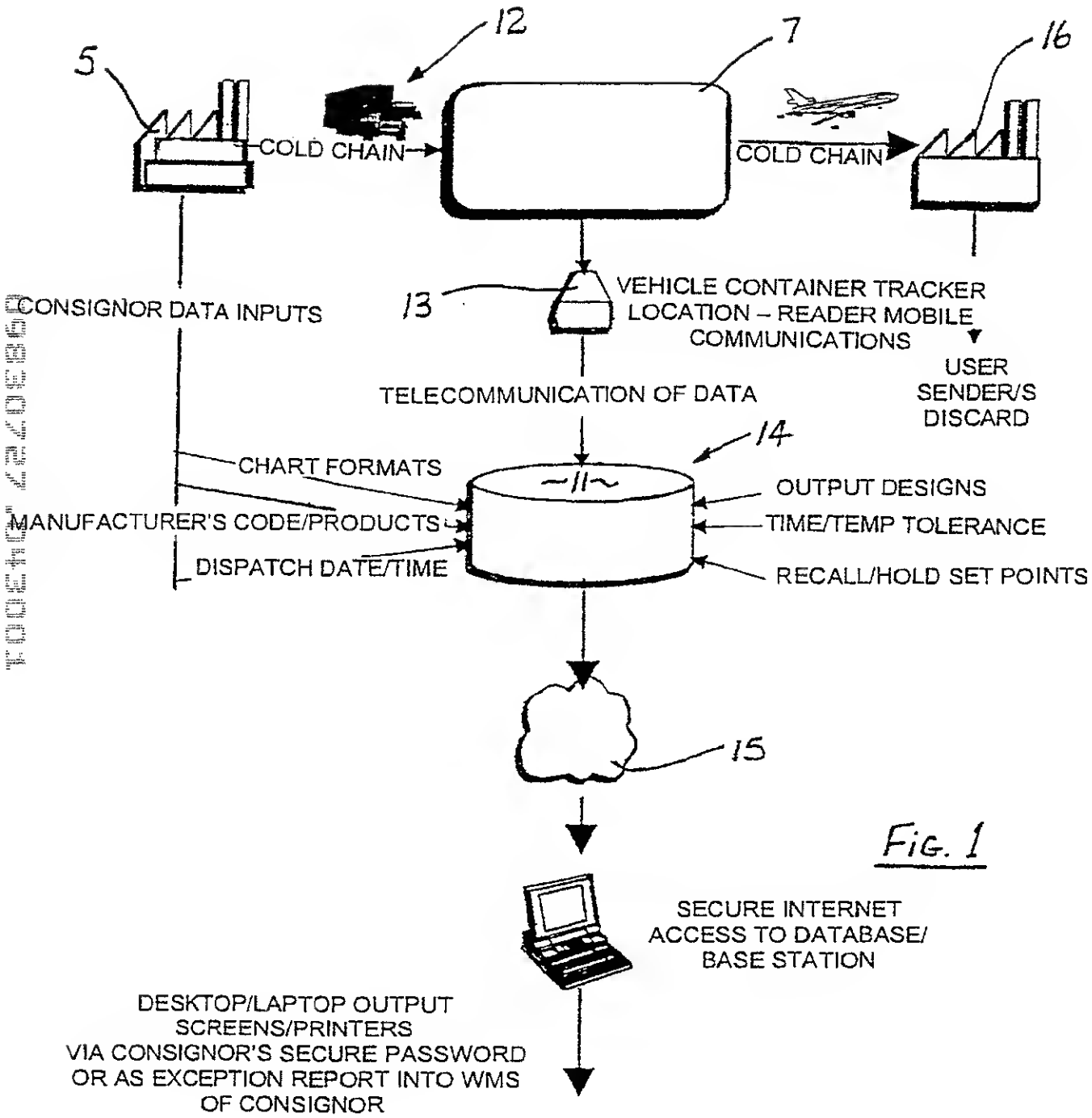

5
12
7
16
COLD CHAIN
COLD CHAIN
CONSIGNOR DATA INPUTS
13
VEHICLE CONTAINER TRACKER
LOCATION – READER MOBILE
COMMUNICATIONS
USER
SENDER/S
DISCARD
TELECOMMUNICATION OF DATA
14
CHART FORMATS
11
OUTPUT DESIGNS
MANUFACTURER'S CODE/PRODUCTS
TIME/TEMP TOLERANCE
DISPATCH DATE/TIME
RECALL/HOLD SET POINTS
15
SECURE INTERNET
ACCESS TO DATABASE/
BASE STATION
DESKTOP/LAPTOP OUTPUT
SCREENS/PRINTERS
VIA CONSIGNOR'S SECURE PASSWORD
OR AS EXCEPTION REPORT INTO WMS
OF CONSIGNOR

Fig. 1

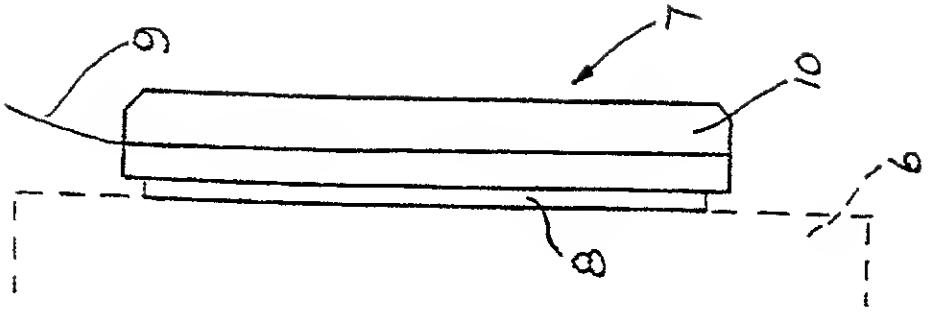


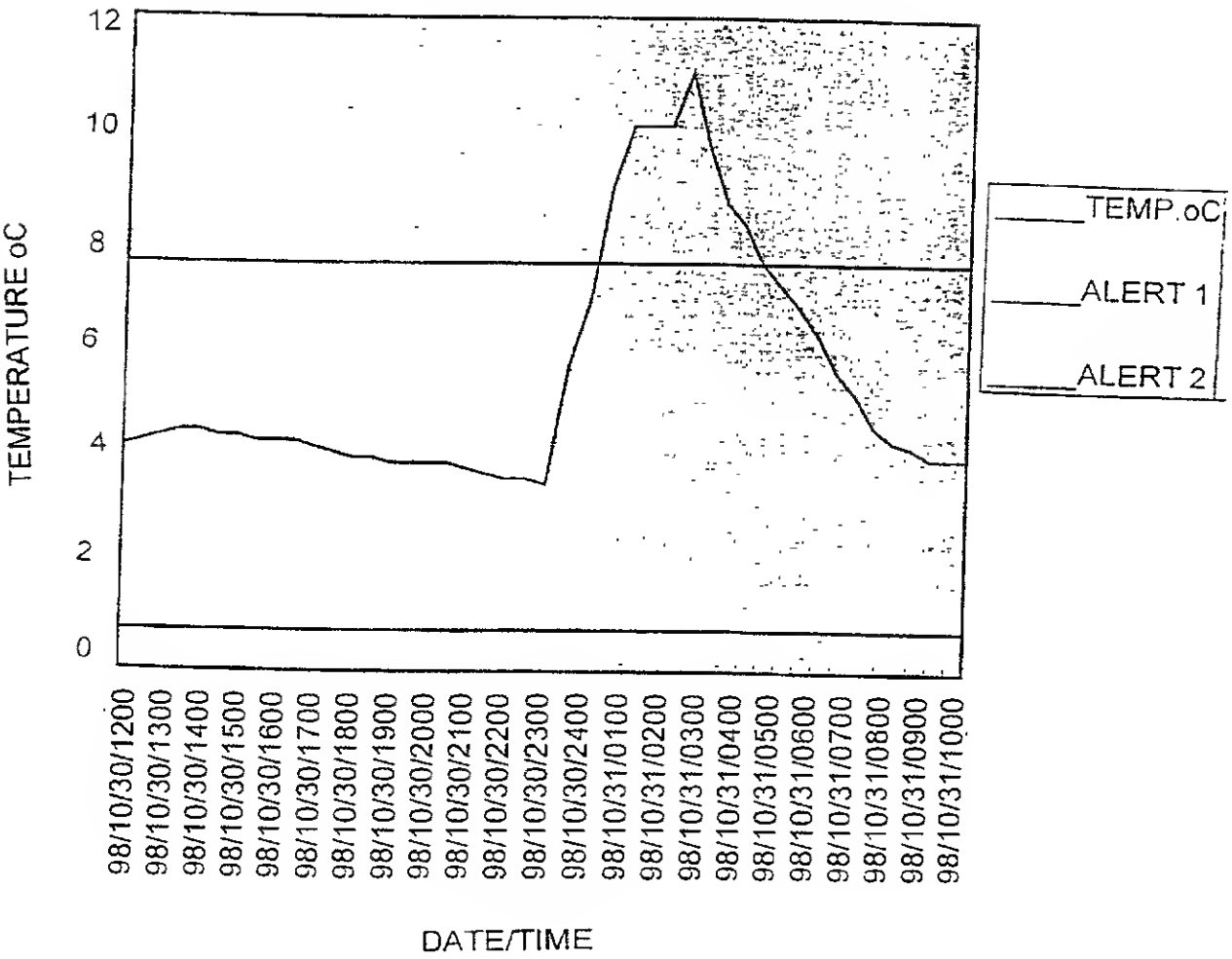
Fig. 2

Consignor Password (secure ****)	**Consignor Input Data for XYZ System** (Keyed into computer at time of Loading)
Consignment Attributes	Green Blue Black Red
Sender Type / Colour	
Sender Serial Number (*** *** ***)	
Date / Time (yyyy/mm/dd/hh/mm)	
Expected Transit Time (dy/hr)	
Maximum Transit Temperature (°C)	
Pitch (Report signal interval in min.)	
Hotline Number (** ** **** ****)	
Alert 1 (red line)-Over Temperature (°C)	
Alert 2 (blue line)-Under Temperature °C)	
Consignor Company Code	
Consignor Location Code	
Consignor Product Code	
Consignor Batch Identity Code	
Consignee Order Number	
Consignee Destination (Country/City)	

Fig. 3

FIGURE 4

CONSIGNMENT TEMPERATURE / TIME CHART 11



PATENT
Attorney Docket No. 211016

COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

This declaration is of the following type:

☐ original ☐ design ☐ supplemental
☒ national stage of PCT
☐ divisional ☐ continuation ☐ continuation-in-part

My residence, post office address, and citizenship are as stated below next to my name. I believe I am the original, first, and sole inventor *(if only one name is listed below)* or an original, first, and joint inventor *(if plural names are listed below)* of the subject matter which is claimed and for which a patent is sought on the invention entitled:

A METHOD OF RECORDING THE TEMPERATURE OF PERISHABLE PRODUCTS IN COLD CHAIN DISTRIBUTION

the specification of which:

☒ is attached hereto.
☐ was filed on as Application No. and was amended on *(if applicable)*.
☐ was filed by Express Mail No. *as Application No. not known yet,* and was amended on *(if applicable)*.
☐ was filed on as PCT International Application No. PCT/ and was amended pursuant to PCT Article 19 on *(if any)*.

I state that I have reviewed and understand the contents of the specification identified above, including the claim(s), as amended by any amendment referred to above.

I acknowledge the duty to disclose information that is material to the patentability of the application identified above in accordance with 37 CFR 1.56.

I claim foreign priority benefits under 35 USC 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate or 365(a) of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent, utility model, design registration, or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter and having a filing date before that of the application(s) from which the benefit of priority is claimed.

PRIOR FOREIGN PATENT, UTILITY MODEL, AND DESIGN REGISTRATION APPLICATIONS						
COUNTRY	PRIOR FOREIGN APPLICATION NO.	DATE OF FILING (day,month,year)	PRIORITY CLAIMED			
Australia	PP6863 ✓	30 October 1998 ✓	X	YES		NO
				YES		NO
				YES		NO

I claim the benefit pursuant to 35 USC 119(e) of the following United States provisional patent application(s):

PRIOR U.S. PROVISIONAL PATENT APPLICATIONS, BENEFIT CLAIMED UNDER 35 USC 119(e)	
APPLICATION NO.	DATE OF FILING (day,month,year)

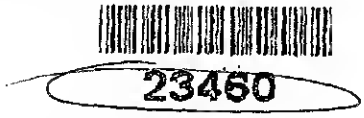
I claim the benefit pursuant to 35 USC 120 of any United States patent application(s) or PCT international application(s) designating the United States of America listed below and, insofar as the subject matter of each of the claims of this patent application is not disclosed in the prior patent application(s) in the manner provided by the first paragraph of 35 USC 112, I acknowledge the duty to disclose material information as defined in 37 CFR 1.56 effective between the filing date of the prior patent application(s) and the national or PCT international filing date of this patent application.

PRIOR U.S. PATENT APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S., BENEFIT CLAIMED UNDER 35 USC 120					
U.S. PATENT APPLICATIONS			Status *(check one)*		
U.S. APPLICATION NO.	U.S. FILING DATE		PATENTED	PENDING	ABANDONED
1.					
2.					
3.					
PCT APPLICATIONS DESIGNATING THE U.S.			Status *(check one)*		
PCT APPLICATION NO.	PCT FILING DATE (day,month,year)	U.S. APPLICATION NOS. ASSIGNED (if any)	PATENTED	PENDING	ABANDONED
4. PCT/AU99/00946	1 November 99				
5.					
6.					

DETAILS OF FOREIGN APPLICATIONS FROM WHICH PRIORITY CLAIMED UNDER 35 USC 119 FOR ABOVE LISTED U.S./PCT APPLICATIONS				
ABOVE APPLICATION. NO.	COUNTRY	APPLICATION NO.	DATE OF FILING (day,month,year)	DATE OF ISSUE (day,month,year)
1.				
2.				
3.				
4.				
5.				
6.				

In re Appln. of Richardson
Attorney Docket No. 211016

As a named inventor, I hereby appoint Leydig, Voit & Mayer, Ltd. to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. Customer Number 23460.



I further direct that correspondence concerning this application be directed to Leydig, Voit & Mayer, Ltd. Customer Number 23460.

I declare that all statements made herein of my own knowledge are true, that all statements made on information and belief are believed to be true, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

1700 Full name of sole or first inventor: Donald George Richardson

Inventor's signature _____

Date 02/07/01

Country of Citizenship: Australia

Residence: Australia
(city/state or country)

Post Office Address: 90 Cutler Road, Clontarf, NSW 2093, Australia AUX
(complete mailing address)

PTO/SB/96 (08-00)